

Magnetic field measurements of O stars with FORS,1 at the VLT

S. Hubrig¹, M. Schöller¹, R.S. Schnerr^{2,3}, J.-F. González⁴, R. Ignace⁵, and H.-F. Henrichs²

1 - European Southern Observatory, Casilla 19001, Santiago 19, Chile

2 - Astronomical Institute "Anton Pannekoek", University of Amsterdam, Kruislaan 403, 1098 SJ Amsterdam, The Netherlands

3 - SRON, Netherlands Institute for Space Research, Sorbonnelaan 2, 3584 CA Utrecht, The Netherlands

4 - Complejo Astronómico El Leoncito, Casilla 467, 5400 San Juan, Argentina

5 - Department of Physics, Astronomy, & Geology, East Tennessee State University, Johnson City, TN 37614, USA

The presence of magnetic fields in O-type stars has been suspected for a long time. The discovery of such fields would explain a wide range of well documented enigmatic phenomena in massive stars, in particular cyclical wind variability, H α emission variations, chemical peculiarity, narrow X-ray emission lines and non-thermal radio/X-ray emission.

To investigate the incidence of magnetic fields in O stars, we acquired 38 new spectropolarimetric observations with FORS,1 (FOcal Reducer low dispersion Spectrograph) mounted on the 8-m Kueyen telescope of the VLT.

Spectropolarimetric observations have been obtained at different phases for a sample of 13 O stars. 10 stars were observed in the spectral range 348--589 nm, HD,36879 and HD,148937 were observed in the spectral region 325--621 nm, and HD,155806 was observed in both settings. To prove the feasibility of the FORS,1 spectropolarimetric mode for the measurements of magnetic fields in hot stars, we present in addition 12 FORS,1 observations of the mean longitudinal magnetic field in θ^1 Ori, C and compare them with measurements obtained with the MuSiCoS, ESPaDOnS and Narval spectropolarimeters.

Most stars in our sample which have been observed on different nights show a change of the magnetic field polarity, but a field at a significance level of 3σ has been detected only in four stars, HD,36879, HD,148937, HD,152408, and HD,164794. The largest longitudinal magnetic field, $\langle B_z \rangle = -276 \pm 88$ G, was detected in the Of?p star HD,148937. We conclude that large-scale organised magnetic fields with polar field strengths larger than 1 kG are not widespread among O-type stars.

Reference: accepted for publication in A&A

Status: Manuscript has been accepted

Weblink: <http://arxiv.org/abs/0808.2039>

Comments:

Email: mschoell@eso.org